SS1 GENERAL MATHEMATICS SCHEME OF WORK FOR FIRST TERM

WEEK[S] TOPIC

1. Revision of Jss3 work and basic operations of integers; addition, subtraction, multiplication and division.
2. **Number Bases**; [a] Conversion from one base number to base ten. [b] Conversion of decimal fraction [bicimals] in one base to base ten. [c] Conversion of numbers from one base to another.
3. [a] Addition, subtraction, multiplication and division of number bases . [b] Application of number bases to computer programming.
4. **Concept of Modular Arithmetic;** Addition, subtraction, multiplication and division of operations of **modular arithmetic.**
5. **Standard form and Approximation**
6. **Indices; [a]**Application of laws of indices. [b] Negative, zero and fractional indices.
7. **Reviewof first half term and periodic test**
8. **Logarithms of numbers greater than 1 [whole number]→ use of logarithm table for multiplication and division of numbers.**
9. **Logarithms CTD; [a] calculations involving powers and roots. [b] Relationship between indices and logarithms.**
10. **[a] simple equation and variation. [b] Change of subject of formulae. [c] Type of variation; direct, inverse, joint and partial variation. [d] Applicationof variation to practical problems.**
11. **Revision.**
12. **Examination.**
13. **Examination**

***REFERENCE BOOKS***

* MAN MATHEMATICS FOR SENIOR SECONDARY SCHOOLS 1
* ESSENTIAL MATHEMATICS FOR SENIOR SECONDARY SCHOOLS 1 BY A.J.S OLUWASANMI
* NEW GENERAL MATHEMATICS FOR SENIOR SECONDARY SCHOOL 1 BY M.F.MACRAE ETAL

Week 1.

REVISION AND BASIC OPERATIONS OF INTEGER

RULES OF DIVISIBILITY TEST

A number is divisible by:

* 2: if the last digit of the number is even or zero.
* 3: if the sum of the digits is divisible by 3.
* 4: if the number formed by the last 2 digits is divisible by 4.
* 5: if the numbers end in 0 or 5.
* 6: if the number is divisible by both 2and 3.
* 7: no rule to it yet.
* 8: if the number formed by the last three digits of the numbers is divisible by 8.
* 9: if the sum of the digits is divisible by 9 and 3.
* 10: if the last digit is zero.
* 11: if the sum of the digits in the odd positions is equal to the sum of digits in the even positions or difference is a multiple of 11.

***DIVISIBILITY test is a rule for determining whether one whole number is divisible by another.***

***EXAMPLE***

***Determine whether7168 is divisible by2, 3, 4,5,6,8,9,10 and 11***

***SOLUTION***

***7168 Is not divisible by 3, 5, 6, 9, 10 and 11. But 2 because the last digit is even, 4 since the last twodigits is divisible by 4. 8 since the last three digit is divisible by 8.***

***EXAMPLE***

***Which number is divisible by 35120?***

***SOLUTION***

***35120 is divisible by 2,4,5,8and 10.***

***2 can divide it since it end with zero, divisible by 4, since the last two digit 20 is divisible by 4, 5 since it end with zero, 8 since the last digit 120 is divisible by 8. 10 since the last digit is zero.***

***EXAMPLE***

***Determine whether 24739 is divisible by 11?***

***SOLUTION***

***24739→sum of digit in odd position 2+7+9=18, sum of digit in even position 4+3=7. Thedifference18-7=11. Then 11 is divisible by 11 and a multiple of 11.***

***CLASS WORK***

***Identify the following numbers that can be divisible by 2,4 ,5 , 6,8, 9.***

***a.3591 b. 2408 c. 7700 d. 18054 e.2032 f. 1827 g.23624 h. 468***

***INTEGERS: integers are whole numberse.g. 1,3, 6,7,9. etc. not 1.5,,5.***

***SIMPLIFY: Simplify is to make easier to do or understand.***

***EVALUATE:To Evaluate is to form a value or quality after thinking , resolving or working a problem.***

***EXAMPLE***

***Find the sum of the following number :***

1. ***961,86 and 422. B. 4312,504,614 and 24***

***Solution***

1. ***961 b. 4 3 1 2***

***(a) 8 6 ++ 5 0 4***

***4 2 2 6 1 4***

***14 6 9 5 4 3 0***

***Subtract 287 from 306.***

***Solution***

***3 0 6***

***- 2 8 7***

***0 1 9***

***Find the product of 452 and 219***

**SOLUTION**

***452***

***X 219 4 0 6 8***

***+ 452***

***904***

***98988***

***Find the value of the following:***

1. ***8(+7). b. 5 (9). (C )***

***Solution***

1. ***8 (+7 )= 87 =+1***
2. ***-5(-9)=-5+9 =+4***
3. ***= =9.6***

***ASSESSMENT: The students are to work the following questions:***

1. ***Find the product of the following numbers:***
2. ***2184x11 b. 5412x99 c. 217x405***
3. ***Subtract the following numbers:***
4. ***23 from 36 b. 94 from 104***
5. ***Find the values of :***
6. ***336÷4 b. 867÷17 c. 1848÷12 d. (-18)÷(-3) e. -25÷4***
7. ***find the values of the following:***
8. ***b.***

***Week 2.***

***NUMBER BASES /BASE NUMBER.***

***Base number is the basis of which each place value column in a number system or the classification of numbers to which one or more other numbers are appended or added.***

TYPES OF BASE NUMBERS.

***OCTAL BASE; Octal base are numbers express in base eight. E.g. 25***

***DENARY/DECIMAL BASE: These are numbers express in base ten. E.g. 18***

***BINARY: These are numbers express in base two. E.g. 1100***

***BICIMAL: This is the fractional binary number or fraction in base two. E.g.***(**) =()= 0.10101… in base two.**

***DUODECIMAL BASE: This is the number system that is express in base 12.***

***HEXADECIMAL: Is system of numbers which is express in base 16. I.e base 2,3,4,5,6,7,8,9,A,B,C,D,E,F.***

***HINT: No number must be equal or greater than the base number in operation. If you are working in base two, the highest digit will be 1 and the lowest number is 0***

***EXPRESSION NUMBERS IN BASE TEN.***

450 = 4 × + 5× + 0× in base ten.

CONVERTION OF NUMBERS TO BASE TEN

EXAMPLE;

Convert the following numbers to denary base:

b. c. .

Solution

1. 101111 =1x +0x +1x +1x +1x +1x +1x

=1x64+0x32+1x16+1x8+1x4+1x2+1x1

=64+0+16+8+4+2+1

=9

B. 43 = 4x+ 3x +2x

= 4x25+3x5+2x1

= 100+15+2

=11.

C.. 43 = 4x + 3x +1x

= 4+3X+1

CONVERTION OF BASE NUMBERS FROM BASE TEN TO ANOTHER BASE.

Express the following base ten numbers to each base giving:

a. 1007 to i. octal base ii.Binary base.

b. 761 to ( i).Base 12 (ii). Base16

SOLUTION

1. 100 =8 1007 2 1007
2. 125 r 7 2 503 r 1

8 15 r 5 2 251 r 1 2 125 r 1

8 0 r 1 2 62 r 1

100= 175 2 31 r 0

2 15 r 1

2 7 r 1

2 3 r 1

2 1 r 1

2 0 r 1

100= 111110111

1. 76= 12 761 16 761

12 63 r 5 16 47 r 9

12 5 r 3 16 2 r F

12 0 r 5 16 0 r 2

76 = 53 76= 2F

CONVERTION FROM ONE BASE TO ANOTHER

HINT: First express the number to base ten and then convert from base ten to the required base.

EXAMPLE

Express 31 to octal base

Solution

31 = 3 X + 1 X + 3 X

= 3 X 36 + 1 X 6 + 3 X 1

=108 +6 +3 = 11

117 base ten to Octal base8 117

8 14 r 5

8 1 r 6

31= 16

FRACTIONAL BASE NUMBER

EXAMPLE: Convert 1011.0 to denary base.

SOLUTION

1011.0 = 1 X + 0 X + 1x + 1 X + 0 X + 1 X

= 1X8 + 0X4 +1X2 + 1X1 +1X +1X

= 8 + 0 + 2 + 1 + +

=11 .

EXAMPLE:

Express as bicimal number.

SOLUTION

(=( .= 0.10101010…

ASSESSMENT: Students should work the following questions

1. Express the following base numbers to base ten.
2. 312.2 b. 1051.1 c .2341

2. Convert the following base ten numbers to bicimals:

(a). (b). (c).(d). (e).

3. Convert the following to base; I. Base 5 ii. Base12. iii. Base 15

a. 5 b. 12 c. 1000 d. 12110.

WEEK 3

RULES OF BASE NUMBER

1. Numbers must not be equal to or greater than the base number under consideration.
2. Base numbers of the same base can be added,subtracted, multiplied and divided otherwise it must first be converted to base ten or equal base before the required operation is done.
3. When subtracting base numbers , the number carried from nearby to support the other becomes the base in operation added to the original number in that position.

BASIC OPERATIONS OF BASE NUMBER.

EXAMPLE

1. Find the sum of the octal numbers 174 and 233. (B). Simplify 23121. (c). find the product of 214 and 23 both in base five.(D). if 10= 68, find the value of x?

SOLUTION

A 1 7 4 b. 2 3 1 1 C. 2 1 4

+ 2 3 - 2 1 3 x 2

4 2 2 0 3 1 2 0 2 . + 4 3 3

1 1 0 3

1. 10 = 68

1 X + 0 X + 4 X = 68

+ 0 + 4 = 68

= 68 – 4 : = 64

X = ±

APPLICATION OF BASE NUMBER TO COMPUTER PROGRAMMING

In computer programming the punched cards uses the binary numbers instead of the letters.

A = 1. B = 2. C = 3. D = 4. E = 5. F = 6. P = 16. U =21. Z = 26. The binary equivalent of the number code of letters in binary, such as:

A = 00001, B = 00010, C = 00011, p = 10000, Z = 11010.

Yes = 1 and No = 0

ASSESSMENT: The students are to do the following questions:

1. If 410 = 211 + . Findx?
2. Simplify the following number bases:
3. 1101x 10 ii. 61 50 iii. If 12 = 83, find y?
4. Represent I LOVE MATHEMATICS in binary code.

ASSIGNMENT: MAN Mathematics for senior secondary schools 1. Page 8, Exercise C4.Numbers,1,2,3 and 7. And miscellaneous Exercises number 3, 6, 10, 14 and 15

MORAL OBJECTIVE: PSALM 90:12. Teach us to number our days so that we may grow in wisdom.

WEEK 4

MODULAR ARITHMETIC

Modular arithmetic is a branch of Mathematics use to predict the outcomes of cyclic events such as days of the week, marketdays, months of the year, time etc.

RULES OF MODULAR ARITHMETIC

* The modulo value must be greater than the number worked upon.
* When using cyclic pattern in adding numbers, you must count clock wise direction.
* In subtraction of numbers , you must count anti -clock wise direction

EXAMPLE:

The shorter hand of a clock points to 5 on a clock face. What number does it point to after 30 hours?

Solution

30 hours after = 11 o” clock.

1. Find the following numbers in their simplest form in modulo 4
2. 15 b. 102

Solution

15(mod4) = 15÷4

3 remainder 3, therefore 3 the remainder is taken as 3 mod 4

102mod4 = 102 ÷4 = 25 remainder 2

102 (mod 4) = 2 mod 4

ADDITION OF MODULO ARITHMETIC

EXAMPLE

Find the following modulo addition

:a.42 28 (mod 8) b. 54 25 (mod 5)

Solution

1. 42 + 28 = 70 mod 8

70 mod 8 = 6 mod 8

1. 54 + 25 = 79 mod 5

79 mod 5 = 4 mod 5

SUBTRACTION OF MODULO NUMBERS

Find the simplest form of the following in their giving moduli.

1. -5 mod 6 b. -17 mod 10 c. -75 mod 7

SOLUTION

1. -5 mod 6 = -6x1+1 = 1 mod 6 the value added to the negative number to give the require result becomes your result.
2. -17 mod 10 = -10 x 2 + 3 = 3mod 10.
3. -75 mod 7 = -7 x 11+2 =2 mod 7.

MULTIPLICATION OF MODULO NUMBERS

Evaluate the following in their moduli.

1. 16 7 mod 5 b. 21 65 mod 4

SOLUTION

A 16 X 7 = 117 mod 5, which is 2 mod 5

1. 21 x 65 = 1365 mod 4 = 1mod 4

EQUATION OF MODULO

Solve the following equations in their giving moduli

1. 3x =5mod 7 b. 2x + 3 =1 mod 6 c.

SOLUTION

1. 3x =5+7 ,. 3x =12

X = 4 mod 7

1. 2x +3 =1+6 , 2x +3 =7

2x 7 -5, then 2x = 4

X =2 mod 6

ASSESSMENT: Solve the following questions;

1. Use the cycle number in modulo 6 to simplify the following.
2. 2 + 10 (ii). 5 + 5 (iii) 15 + 37 (iv) 2 – 9 (v) 0 – 22
3. A toy car starts at a point 0 and runs around a circular track of 2 meters. How far is the car from its starting point along the track when it has gone :
4. 6m (b) 15m (c) 21m (d) 87m
5. Find the following numbers in their simplest form in modulo 4:

(i). 62(ii). 102 (iii) -56 (iv) -78 (v) -202

1. Solve the following equations in the set of positive integers of each modular arithmetic:
2. 3X + 4 = 7 mod 8 ii. 4X – 3 = 6 mod 7 iii. – 2X + 2 = 0 mod 5 IV. = 2 in (a). Mod 5 (b). Mod 6 (c). mod 9

MORAL OBJECTIVE: EXODUS 15:25and he cried unto the Lord and there he proved them.

WEEK 5

STANDARD FORM AND APPROXIMATION

STANDARD FORM: Is a convenient way of writing very large or small numbers. It is the product of the numbers in powers of 10 to determine the position of the decimal pointand it´s writing between 1 and 9 i.e. a X . Where ais the number between 1and 9 and n is the position of the decimal point.

EXAMPLE:

Express the following numbers in standard form;

1. 9 (b) 54.6 (c) 570200

SOLUTION.

1. 9 = 9 x (b) 54.6 = 5.46 x (c) 570200 = 5.702 x

NEGATIVE POWERS (NUMBERS LESS THAN 1 )

Express the following numbers in standard form;

1. 0.02 (b) 0.000175

SOLUTION

1. 0.02 = 2 x (b) o.000175 =1.75 x .

ADDITION AND SUBTRACTION OF NUMBERS IN STANDARD FORM

Simplify the following;

1. 5.14 x + 2.842 x (b) 5.24 x 4.33 x

SOLUTION

1. 5.14 x = 5.14 x 10x10x10x10x10x10x10 = 51400000

2.842 x = 2.842 x 10x10x10x10x10 = 284200 +

51684200

51684200 =5.16842 x

1. 5.24 x = 5.24 x= = 0.0000524

4.33 x = 4.33 x = = 0.00000433

0.0000524 0.00000433 =0.00004803

0.00004807 =4.807 x

MULTIPLICATION AND DIVISION OF STANDARD FORM

Simplify the following:

1. 8.222 x x 6.32 x (b) 2.8 x 1.5 x

SOLUTION

1. (8.222 x 6.32) x () = 51.96304 x

5.196304 x =5.196304 x

(b) (2.8 1.5) x ( ) = 1.86667 x

1.86667 x

APPROXIMATION (SIGNIFICANT FIGURE, DECIMAL PLACES AND ROUNDING OFF)

PPROXIMATION: Is calculating values or numbers only to a certain degree of accuracy.

SIGNIFICANT FIGURE: Is a process in which each of the digits in a number that are needed to a given accuracy is presented.

DECIMAL: is the writing of numbers to a required fractional part.

EXAMPLE:

Approximate the following to the nearest (i) ten (ii) hundred (iii) thousand

1. 7562 (b)907235 (c)8991

SOLUTION

1. 7562 = 7560 (nearest ten)

= 7600 (nearest hundred)

=8000 (nearest thousands)

1. 907235 = 907240 (nearest ten)

= 907200 (nearest hundred)

=907000 (nearest thousand)

© 8991 = 8990 (nearest ten)

= 9000 (nearest hundred)

= 9000(nearest thousands)

SIGNIFICANT FIGURE: Express the following numbers to (i) 1s.f (ii) 2s.f (iii) 3s.f

1. 78602 (b) 702.976 (c) 0.000057849

SOLUTION

1. 78602 = 80000 (1s.f), 79000 (2s.f), 78600(3s.f)
2. 702.976 = 700 (1s.f), 700(2s.f) 703 (3s.f)
3. 0.000057849 = 0.00006(1s.f), 0.000058(2s.f), 0.0000578(3s.f)

DECIMAL PLACES: Express the following numbers to ; (i) 2d.p (ii)3d.p

1. 67.3994 (b) 0.00749

SOLUTION

1. 67.3994 = (i) 67.40(2d.p) , (ii) 67.399(3d.p)
2. 0.00749 = (i) 0.01(2d.p), (ii) 0.007(3d.p)

ASSESSMENT: Solve the following questions;

1. Write the following in standard form:
2. 7560 (ii)7560000000 (iii) 0,00756 (iv) 0.000000756
3. Find each of the following ,leaving your answers in standard form:
4. (4 x ) x (2.6 x ) (ii) (6.4 x (8 x
5. Evaluate (9.05 x ) + (6.5 x ) – (6.5 x ) giving your answer in standard form.
6. Express each of the following numbers to : (i) 1s.f, (ii) 3s.f, (iii) 2d.p (iv) 3d.p
7. 799.8094 (b) 6.3006 (c) 0.0014698

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*WEEK 6*

INDICES

INDICES: are numbers expressed in powers on ten i.e. . The analysis and simplification of indices depends on the basic interpretation and rules of indices as enumerated below.

LAWS OF INDICES

1. = 1
2. = (
3. ( =
4. =

EXAMPLES:

Write down the values of the following in index form:

1. x x 4x 2 (iii) 16 (iv) ()

SOLUTION

1. x 4x 2 = (5 x 4 x 2) = 40 =
2. = (16 = 4
3. =
4. = = = 1÷ = 1 x = or 2.25 or 2

Simplify the following:

1. x ( (b) 3÷ 6

SOLUTION

1. x = x =
2. (3÷6) = () = .

ASSESSMENT

Simplify the following questions:

(1(2)(3). x ÷ (4) -10÷ (-5) (5) x x (6)

ASSIGNMENT: MAN Mathematics for senior secondary school 1

1. Page 11 Exercise B1 numbers 8, 10, 17,20 and 30.
2. Page 12, exercise B3 e,f,I,k,r,t ,v and z
3. Page 13 exercise B4 a, b, c, d, e, g, h and i.

WEEK 7 Review of first half and periodic test

Week 8

LOGARITHMS OF WHOLE NUMBERS

The logarithms of any number N to any base M is the index or power to which the base must be raised, to equal the number N.

The logarithms of any given number consist of two parts called the characteristics and the mantissa.The characteristics is a whole number which can either be positive, zero or negative integers, While the Mantissa is the decimal (fractional) part of the integers always from the table values.

EXAMOLE

399 = 2.6010. 2 Is the characteristics of the number and 6010 from table is the Mantissa or 3.99 x

Find the Logarithms of the following numbers:

1. 8615 (b) 690460 (c) 1.607

SOLUTION

1. 8615 = 8.615 x : in mathematics table, check logarithm of 86 under 1 difference 5 = 9350+3
2. 690460 = 6.90460 x
3. 1.607 = 1.607 x

ANTILOGARITHM: Is the opposite of logarithm.

Find the original number of the following logarithms numbers:

1. (b) (c) 6.3892

SOLUTION

1. = 1.862, from antilogarithm table check 27 under zero since there is no third value and the zero before the point (characteristics) determines where the point occupies in the number. Add onto every positive characteristics to determine your value
2. = 3698.0 or 3698
3. 2450000.0

MULTIPLICATION OF NUMBERS

When multiplying numbers in logarithms, their table values are been added before checking antilogarithms for its solutions.

EXAMPLE

Evaluate the following using table:

1. 143.8 x 23.46 (b) 8234 x 70000

SOLUTION

(a)143.8 x 23.46 = NUMBER LOGARITHM

143.8

23.46 +

Antilogarithm of 5280 = 3374

143.8 x 23.46 = 3374.0

(b) 8234 x70000 = NO LOG

8234

70000 +

=

Antilog of 7609 = 5766 characteristics is 8+1 =9 numbers before point

8234 x70000 = 576600000

DIVISION OF NUMBERS IN LOGARITHMS: When dividing numbers in logarithms we subtract their values

EXAMPLE

Evaluate the following numbers using table:

1. 912.4 ÷ 30.42 (b) 36.75 x 284.7 ÷ 26.45

SOLUTION

1. 912.4 ÷ 30.42 = NO LOG

912.4

30.42 -

=

Antilog of 4770 = 2999

912.4 ÷ 30.42 = 29.99.

(b) 36.75 x284.7 ÷26.45 = NO LOG

36.75

284.7 +

26.45 -

Antilog of 5973 =3957

36.75 x 284.7 ÷ 26.45 = 395.7

ASSESSMENT: Using table evaluate the following numbers:

1. (a)497.2 x 8.789 (b) 89 x34.56 x2.094 (c) 8050 ÷ 20.15 (d) 45.08 ÷ 5.462
2. (a) 98.45 x 56 ÷ 30.8 (b) (c)

3. Find the antilogarithms of the following numbers:

1. (b) (c) 0.5971 (d) 7.8903 (e) 2.0079

WEEK 9

SQUARES OR POWERS OF NUMBERS IN LOGARITHMS

When squaring numbers in logarithms you multiply the power by the logarithm values

EXAMPLE

Evaluate the following numbers using logarithm table:

1. (18.42 (b) (

SOLUTION

1. (18.42 = NO LOG

(18.42 1.2653 x 4 = 5.0612

Antilog of 0612 =1151

(18.42 = 115100

(b) ( = NO LOG

67.9 1.8319

5.23 0.7185

1.1134 X 3 = 3.3402

Antilog of 3402 = 2189

( = 2189

SQUARE ROOTS OF NUMBERS IN LOGARITHMS

When finding the square root of any number with logarithm table , you divide the table value by the value of the square root.

EXAMPLE

Evaluate the following number using logarithm table:

1. (b)
2. = NO LOG

0.7551÷ 5 = 0.15102

Antilog of 1510 = 1.416

1. = NO LOG

=

= +

=

161.5 -

=

Antilog of 1094 = 12.86

RELATIONSHIP BETWEEN INDICES AND LOGARITHMS

Considering numbers in ten (10)

NUMBERS INDICES LOGARITHM

10 = 1

100 2

1000 3

-2

0.00001 -5

ASSESSMENT: Using tables, evaluate the following numbers;

1. (a) (56.89 (b) (3.9562 (c) (d)
2. (a) x 45.1 (b) x 92.6
3. (a) (b) (c)

MORAL OBJECTIVES: JOHN 3:33 the man who has accepted it has certified that God is truthful

WEEK 10

SIMPLE EQUATION AND VARIATION

SIMPLE EQUATION: is any algebraic equation with one unknown.

EXAMPLE

Solve for p in the equation p – 7 = 24

SOLUTION

.IF P – 7 = 24, then add 7 to both sides of the equation

P -7 +7 = 24 + 7

P = 31

Solve the equation 5(c +2) – 3(3c -5) = 1

Solution

5c+10-9c+15 =1. First open the bracket, collect like terms and simplify.

5c-9c+10+15 = 1

-4c+25 = 1, subtract 25 from both sides of the equation

-4c = 1-25,

-4c = -24, divide -4 by both sides

C = 6.

CHANGE OF SUBJECT OF FORMULAE

A formula is an equation consisting of letters which represent quantities.

EXAMPLE

Make each of the following letters giving the subject of formula:

1. A= ax + b, x (b) T = a + (n-1)d, a (c) T = 2, g

SOLUTION

1. A=ax + b. make x the subject of formula

Subtract b from both sides

A – b = ax divide both sides by a

= x

1. T = a + (n-1) d, a. subtract (n-1)d from both sides

T – (n-1) d = a or a =T – nd + d

©T = 2, g. Divide both sides by 2

= , cross multiply

Tg =2l, divide both sides by T

g =

VARIATION: is a change or difference in condition or amount or level etc. within certain limits.

TYPES OF VARIATION

Direct variation, indirect or inverse variation, joint variation and partial variation

Direct variation is the proportional increase in x with a corresponding increase in y or a decrease in x with a corresponding decrease in y when considering two quantities X and Y. that is X Y, where is sigh of proportionality and the equation becomes X = kY where k is constant.

EXAMPLE

The number of bottles of wine drinks is directly proportional to the cost of the bottles of wine drinks. If 10 bottles of wine drink cost ₦400

1. What is the cost of 18 bottles?
2. How many bottles can₦200 buy?

SOLUTION

Let N = numbers of wine bottles and C = cost of wine drinks

N C. then N = Ck, N = 10 ,C = ₦400

10 = 400x k . k = =

Therefore the equation connecting N and C is N =

1. N = = 18 =

C = 18 x 40 = 720. The cost of 18 bottles of wine drinks is ₦720

1. N = = 5. The numbers of bottles ₦200 can buy is 5 bottles.

INDIRECT OR INVERSE VARIATION

Given two quantities X and Y such that Y increases with a corresponding decrease in X or a

Decrease inY with a corresponding increase in x then Y varies inversely as X. Y then,

the equation becomes Y

EXAMPLE

Y is inversely proportional to x. if y = 9 when x = 4, find the equation connecting x and y

SOLUTION

Y then y =

9 = , then k = 9x4 = 36

The equation connecting x and y is y = .

JOINT VARIATION

This involves three or more variables or quantities in a relationship which occur in many forms. It involves the combination of two direct variations or the combination of one direct and one inverse.

EXAMPLE

Z and z y that is two direct variables. Which is z xy. Equation is z = kxy

V varies directly as T and inversely as P can be written as V

EXAMPLE

Y varies jointly as x and y. W x= 2 and z = 3, y = 30. Find the equation connecting the relationship xyz

SOLUTION

Y xz y = kxz

30 = k x 2 x3 30 = 5k

K = = 6

Equation of the relationship is y = 6xz

PARTIAL VARIATION

Partial or part variation consists of two or more parts of quantities added together. One part

may be constant while the others can vary either directly, indirectly or jointly.

S is partly constant and partly varies directly as T

This statement can be written as :

S k + T. Then the equation is S = k + aT where k and a are constants.

EXAMPLE

X is partly constant and partly varies as y. When y = 5, x = 7 and when y = 7, x = 8. Find

1. The law of the variation. (b) x when y = 11.

SOLUTION

x k + ay x = k + ay where a and k are constants.

When y = 5, x = 7 : 7 = k + 5a …………(1)

When y = 7, x = 8: 8 = k + 7a …………..(2)

Solving the equation simultaneously, subtract (1) from (2)

2k = 1, then a = .

Substitute for a in (2), 8 =k + 7 x

16 = 2k + 7, 16 – 7 = 2k

K = or 4.5

The law of variation is x = or 2x =9 + y.

1. When y = 11, 2x = 9 + 11

2x = 20, x = 10.

ASSESSMENT

Evaluate the following questions,

1. The speed s km/h of a car is partly constant and partly varies as the time t the brake is applied. When t = 0, s = 40 and when t = 8, s =30, find s when t = 10 and t when s = 24.
2. A quantity Q is the sum of two quantities, one of which is constant while the other varies inversely as the square of R. when R =1, Q =-1 and when R =2, Q = 2. Find the positive value of R when Q = 2.
3. Y , y = 27 when x =9 and z = 2. Find
4. The relation between x, y and z.
5. Find y when x =14 and z = 12.
6. The price of a material in the market varies indirectly with the number of people demanding the material. When there are 80 people, the price of the material is ₦3.50. what is the price when there are 56 people?
7. Make the given letters the subject of the formula of the following equations:
8. = , Q (b) A = ) , h,d (c) A = r, r
9. Solve the following equations:
10. 8y -19 = 5 +3y (b) 12 – 3t – 9 = 3 – 5t (c) 2 = 5(5w – 2) – 9 (3w – 2) (d) + = 6 (e) - =

MORAL OBJECTIVES: JAMES 1:17 Every good gift and every perfect gift is from above, and cometh down from the Father of lights, with whom is no variableness, neither shadow of turning.

Week 11 Revision